

REMARKS

Claims 1-35 are pending in the present application and stand rejected on various grounds. Claims 1, 27, 32 and 33 are amended herein. The present amendments are fully supported by the specification and claims as originally filed and do not add new matter. As discussed in detail below, the amendments are believed to overcome the rejections under §103 by explicitly distinguishing the DiMeo Jr. et al reference, and to overcome the §112 rejections by clarifying the steps of the claimed methods.

Claim Rejections Under 35 U.S.C. §103

The Examiner has maintained the rejection of claims 1-27 under 35 U.S.C. §103(a) as unpatentable over DiMeo Jr. et al. (U.S. Patent No. 5,972,430) in view of Kirlin et al. (U.S. Patent No. 5,453,494). Claims 25 and 26 were further rejected over DiMeo and Kirlin in view of Maiti et al. (U.S. Patent No. 6,020,024). In particular, the Examiner states that DiMeo discloses a CVD method for forming multi-component oxide layers.

In response to Applicants' prior argument that DiMeo Jr. et al. does not teach ALE, the Examiner indicated that the CVD method of DiMeo Jr. et al. is described as an equivalent variant to ALE. Importantly, the examiner noted that the features of ALE that distinguish the CVD method of DiMeo Jr. et al. were not recited in the claims.

Applicants respectfully submit that the term "atomic layer epitaxy" (ALE) is well known in the art to refer to a process that involves alternating, self-limiting surface reactions. Thus, one of skill in the art would recognize that the methods of Claims 1 and 27 are inherently self-limiting. Nevertheless, solely to facilitate prosecution Applicants have amended independent Claims 1 and 27 to explicitly recite the alternating and self-limiting nature of the claimed ALE processes.

As DiMeo et al. does not teach a method comprising alternating, self-limiting surface reactions, Applicants respectfully submit that the rejections under 35 U.S.C. §103(a) should be withdrawn.

Claim Rejections Under 35 U.S.C. §112

Claims 28-35 stand rejected under 35 U.S.C. §112, second paragraph, as being incomplete for omitting essential steps. In particular, the Examiner indicated that the step of oxidant introduction between strontium and titanium metal precursor introduction is omitted.

Claim 28 recites pulsing a second reactant comprising oxygen into the reactor during the growth cycle. However, to clarify the claimed method Applicants have amended Claim 28 to indicate that the claimed pulse of reactant comprising oxygen is provided between pulses of the first reactant and the third reactant.

Applicants would like to point out that, because ALE involves a continuous string of cycles, the pulse of second reactant can be provided after the pulse of the first reactant and prior to the pulse of the third reactant, or after the pulse of the third reactant and prior to the pulse of the first reactant. These alternative pulsing orders are recited in Claims 32 and 33, which have been amended to clarify when the pulsing occurs and that there is a purge between pulses.

As the method of Claims 28, 32 and 33 are believed to be clear, Applicants request withdrawal of the rejection under 35 U.S.C. §112, second paragraph.

The Examiner also rejected Claims 31, 34 and 35 under 35 U.S.C. §112, first paragraph, stating that the specification only describes the deposition of Sr-O and Ti-O alternating layers and does not support the addition of barium to the layers.

Applicants respectfully submit that explicit support for the addition of Ba to the layers is provided in the specification at page 7, lines 6-11, page 8, lines 23-25 and in Example 3 (page 11, lines 23-28), which describes the growth of BaTiO₃ films. In view of this disclosure, Applicants request withdrawal of the rejection of Claims 31, 34 and 35 under §112, first paragraph.

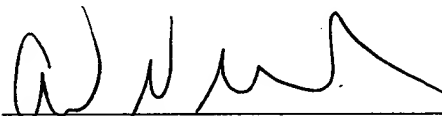
CONCLUSIONS

In view of the present amendments and arguments, Applicants request reconsideration and submit that the pending claims are in condition for allowance. If some issue remains that the Examiner believes can be addressed by Examiner's Amendment, he is cordially invited to telephone the undersigned for authorization.

Respectfully submitted,

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Dated: April 11, 2003

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